

Assessment Schedule 2008**Science: Describe aspects of chemistry (90189)****Evidence Statement**

Question	Evidence	Achievement	Achievement with Merit	Achievement with Excellence										
ONE (a) (i) (ii)	Diagram showing 8 protons and 10 neutrons in nucleus, with 8 electrons orbiting, 2 in first shell, six in second. Atom is neutral as there are the same number of positive particles / charges / protons as negative particles / charges / electrons.	Correct number of protons, neutrons and arrangement of electrons in diagram (accept conventional symbols (+ for protons, – for electrons), or p / n / e) OR description of same number of protons and electrons /positive and negative particles or charges	Correct diagram AND explanation.											
(b)	<table><tr><th>Scientific name</th><th>Formula</th></tr><tr><td>Iron sulfate / Ferrous sulfate / iron (II) sulfate</td><td>FeSO₄ or</td></tr><tr><td>Ammonium nitrate</td><td>NH₄NO₃</td></tr><tr><td>Potassium nitrate</td><td>KNO₃</td></tr><tr><td>Calcium hydrogen carbonate</td><td>Ca(HCO₃)₂</td></tr></table>	Scientific name	Formula	Iron sulfate / Ferrous sulfate / iron (II) sulfate	FeSO ₄ or	Ammonium nitrate	NH ₄ NO ₃	Potassium nitrate	KNO ₃	Calcium hydrogen carbonate	Ca(HCO ₃) ₂	Three correct		
Scientific name	Formula													
Iron sulfate / Ferrous sulfate / iron (II) sulfate	FeSO ₄ or													
Ammonium nitrate	NH ₄ NO ₃													
Potassium nitrate	KNO ₃													
Calcium hydrogen carbonate	Ca(HCO ₃) ₂													
(c)	i) K in Group 1 Mg in Group 2; Electron arrangement of K 2,8,8,1 Mg 2,8,2 ; Charges on ions K ⁺ Mg ²⁺ ii) When these elements react, K loses one electron and forms a +1 ion, while Mg loses two electrons and forms a +2 ion, in order to adopt the stable electron configuration 2,8,8 and 2,8 respectively. Hydroxide carries a charge of –1, therefore it requires one OH [–] for each K ⁺ ion but two OH [–] ions for each Mg ²⁺ ion to form a neutral compound/ balance out the charges.	Any four boxes from table in (i) OR Loses electron(s) to form (stable) ions K → K ⁺ and Mg → Mg ²⁺ OR OH ion is –1, so one OH [–] ion required to balance K ⁺ and two OH [–] ions required to balance Mg ²⁺	Any four boxes correct AND Loses electron(s) to form (stable) ions K → K ⁺ and Mg → Mg ²⁺ OR OH ion is –1, so 1 OH [–] ion required to balance K ⁺ and 2 OH [–] ions required to balance Mg ²⁺	Any four boxes correct AND Loses electron(s) to form (stable) ions K → K ⁺ and Mg → Mg ²⁺ AND OH ion is –1, so 1 OH [–] – ion required to balance K ⁺ and 2 OH [–] ions required to balance Mg ²⁺										
TWO (a)	Conducts electricity, ductile, solid at room temperature.	Two properties stated												
(b)	Heavy/high density ensures fishing lines sink, low reactivity is needed so the metal does not react/corrode in water Low melting point can be easily melted to pour mould/Solid at room temperature so can tie line to it/malleable so can be bent or crimped around line	Two properties stated OR One property plus explanation.	2 correct properties AND Explanation of one property linked to use											

(c)	Zinc reacts faster than iron, Both reactions produce hydrogen gas, Both reactions form (metal) chlorides, metal + acid →(metal) salt + hydrogen, iron + hydrochloric acid → iron chloride + hydrogen, zinc + hydrochloric acid → zinc chloride + hydrogen.	ONE correct word/formula equation OR One similarity OR One difference.	TWO of Correct word/ formula equation OR One similarity stated OR One difference stated.	Correct word/ formula equation AND One similarity stated AND One difference stated.										
(d)	Observations: Burns with bright/ white light or white ash formed. $2\text{Mg} + \text{O}_2 \rightarrow 2\text{MgO}$ (correct subscript and capitals) Magnesium has 2 electrons in its outer shell (2,8,2) and when reacting with oxygen loses these 2 electrons to form the stable Mg^{2+} ion (2,8). The oxygen atoms (2,6) readily accept these electrons to form the stable O^{2-} ion (2,8) to form the (ionic) compound MgO .	Correct observation OR Electron arrangement for magnesium and oxygen OR Magnesium gives up electrons and oxygen receives electrons OR Word equation OR Formula equation.	Correct observation OR Correctly balanced equation AND Electron arrangement for magnesium and oxygen OR Magnesium gives up electrons and oxygen receives electrons.	Correct observation AND Electron configuration and reactivity for both magnesium and oxygen; and magnesium gives up electrons and oxygen receives electrons AND Balanced equation.										
THREE (a)	<table><tr><td>Estimated pH</td><td>Colour when tested with Universal indicator</td></tr><tr><td></td><td>(i) red</td></tr><tr><td>(ii) 8 – 12</td><td></td></tr><tr><td></td><td>(iii) yellow/orange</td></tr><tr><td>(iv) 7</td><td></td></tr></table>	Estimated pH	Colour when tested with Universal indicator		(i) red	(ii) 8 – 12			(iii) yellow/orange	(iv) 7		THREE correct.		
Estimated pH	Colour when tested with Universal indicator													
	(i) red													
(ii) 8 – 12														
	(iii) yellow/orange													
(iv) 7														
(b)	Sodium hydrogen carbonate + hydrochloric acid → carbon dioxide + sodium chloride + water $\text{NaHCO}_3 + \text{HCl} \rightarrow \text{NaCl} + \text{H}_2\text{O} + \text{CO}_2$ At pH 6.5 the pool water is too acidic so sodium hydrogen carbonate is added to raise the pH back to the ideal region of pH 7 to 7.6 as it is a base and it neutralises the acid.	Correct word equation. OR Sodium hydrogen carbonate neutralises the hydrochloric acid OR Sodium hydrogen carbonate is a base.	Balanced equation OR Correct word equation AND Sodium hydrogen carbonate is base that neutralises the hydrochloric aci	Balanced equation AND Correct word equation AND Sodium hydrogen carbonate is base that neutralises the hydrochloric aci										

Judgement Statement

Achievement	Achievement with Merit	Achievement with Excellence
Total of FIVE opportunities answered at Achievement (or higher). $5 \times A$	Total of SEVEN opportunities answered with FOUR at Merit (or higher) and THREE at Achievement level. $4 \times M + 3 \times A$	Total of SEVEN opportunities answered with TWO at Excellence, THREE at Merit and TWO at Achievement level. $2 \times E + 3 \times M + 2 \times A$